

**Before the  
Federal Communications commission  
Washington, D.C. 20554**

In the Matter of	)	
	)	
Amendment of Parts 1, 21, 73, 74 and 101 of the	)	
Commission's Rules to Facilitate the Provision of	)	WT Docket No. 03-66
Fixed and Mobile Broadband Access, Educational and	)	(Terminated)
Other Advanced Services in the 2150-2162 and 2500-	)	
2690 MHz Bands	)	
	)	
<b>Transforming the 2.5 GHz Band</b>	)	WT Docket No. 18-120

**Initial joint comments of the Nebraska Department of Education (NDE),  
Nebraska Educational Television (NET), and the  
State of Nebraska Office of the Chief Information Officer (OCIO)**

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**I. INTRODUCTION**

1. Release of this NPRM and rededication of the EBS spectrum to education could not be timelier. Transmission technology has caught up to the need and the ability for licensed users to make a significant impact on educational opportunities. Schools and State Departments of Education are embracing personalized learning with greater utilization of digital resources in the learning environment. More and more, schools are providing laptops, tablets, or other computing devices for each student in a "one-to-one" environment so that every student has what they need to complete their learning objectives. In Nebraska, 138 of 244 districts have deployed one-to-one initiatives in some or all of its grade levels. In the 2016-17 technology profile, Nebraska schools reported a total of 141 high/middle schools and 181 elementary schools with some type of one-to-one program for students.

2. Equity is diminished when those same students head home where there is no connection to a data network and the school's digital learning tools. Teachers are less likely to utilize digital learning or make homework assignments when students lack access at home. Parents are generally excited about the implementation of digital learning environments, but the equity issue arises again when 9% (urban) to 34% (rural) of the state's student population have no access at home. One parent in a rural Nebraska town wrote to the district leadership on how she had to drive to a neighboring rural town to get access:

[excerpt] “So, here Liz & I sit, in the running car, outside the library in Syracuse, so we can use the free WiFi. Liz tells me she was told, “Since you get to take the Chromebooks home, you have no excuse for not getting the vocabulary homework done.” [see NE-EBS Attachment A: 12/2016 Parent Email to School District OR1].

Equity is not equity when students have to leave their home and drive to another location just to get online.

3. In Nebraska, EBS has the potential to be a critical component in extending the *Network Nebraska* broadband backbone and direct connection to the school’s resources, if strategically deployed. By blanketing the state with wireless service, all learners would have access to the information and digital resources they need for anytime, anywhere learning.

## **II. BACKGROUND**

### **A. Current status of *Network Nebraska* Broadband Backbone**

4. The Nebraska Legislature created *Network Nebraska* in 2007 as a statewide network interconnecting public and private schools and colleges. By 2017, 100% of the 244 public school districts had joined *Network Nebraska* with fiber Wide Area Network (WAN) circuits and now share over 90 GBPS of daily Internet capacity, purchased at the statewide level. In addition to the school districts, all 17 Educational Service Units (intermediate service agencies) and 25 public and private colleges and universities also belong to *Network Nebraska*. *Network Nebraska* is jointly managed by the State Office of the CIO and the University of Nebraska. It has a 24/7 Helpdesk and its staff monitor all 300+ fiber circuits and Internet access. During the school day, *Network Nebraska* provides superfast and super reliable Internet to 318,000 public K-12 students and 23,000 staff with one of the lowest unit rates in the United States [see attachment B: *Network Nebraska* map].

### **B. Background on Nebraska’s Situation**

5. Nebraska is a very rural and sparsely populated state. Approximately 64% of the 244 school districts have fewer than 500 students K-12 [see Attachment C: Student Sparsity Map]. Over half of the school districts occupy only one building. Only six of the 244 school districts have more than one high school in the district. With 93 separate counties, Nebraska public school district boundaries do not correspond to county boundaries [see Attachment D: Nebraska School District Map]. In addition, Nebraska’s tribal schools are part of the state accredited public school districts operated under local control. Although the state population density averages 23.5 persons per square mile, a vast majority

of the land mass has less than 5 persons per square mile, while the county of Douglas (i.e. Omaha) has over 1,600 persons per square mile.

6. Nebraska students are well-positioned with connectivity and Internet access while at school during the day; however, the situation reverses itself when students return home. An estimated 15-20% (45,000-60,000) of these students either do not have wired or wireless Internet access at all, or are dramatically underserved, far below the 25Mbps/3Mbps benchmark identified by the FCC. In very sparse rural areas and on tribal lands, the proportion of un-served students is believed to be much higher. For those students who are lucky enough to be within range of a cellular service, data caps quickly render this technology useless for educational purposes.

7. Nebraska school districts that have implemented district-owned computing devices that go home with students do so without regard to home connectivity. An estimated 100,000 devices (e.g. Chromebooks, iPads, laptops) have been deployed across the state reaching almost  $\frac{1}{3}$  of Nebraska's K-12 student population. Teachers, knowing that many of their students are without home access, are limited in the types of homework assignments that can be given, since a high level of inequity exists.

8. Nebraska has 270 public libraries. For the vast majority of rural Nebraska, the local public library represents the only source of free Wi-Fi Internet for students without home access. So, families with students routinely load up their car and drive into the library's parking lot after hours and on weekends to get Internet access for homework assignments, research, and other Internet-related activities. And what do they find there? Unfortunately, 82% of Nebraska libraries reported their contracted Internet speeds below 25 Mbps and 68% of these libraries reported download speeds at or below 12 Mbps.

9. In Nebraska's urban school districts where telecommunications competition thrives, at least two providers are offering residential fiber Internet service of 300 Mbps for under \$40/month. In rural Nebraska communities, it is not uncommon to subscribe to DSL service of 1 Mbps up and 6 Mbps down for \$60/month. This is evidence that the digital divide for urban and rural students is actually getting wider, not narrower.

### **C. Technology Pilots to Address Inequitable Access**

10. State leaders have been encouraging technology pilot projects to help address students' inequitable access.

- The State Office of the CIO approached Microsoft with six different projects in order to attract funding to test the applicability of TV White Space (482-698 MHz) for rural settings. Funding requests were not granted.
- Educational Service Unit 5 in Beatrice, Nebraska was awarded a Gigabit Library Network grant of \$15,000 to pilot TV White Space between their ESU and four community hotspots, including the public library. Although the bidirectional transmission was non line-of-sight, the end users' experiences at each location varied between 4 Mbps and 6 Mbps at a distance of 1 to 3 miles.
- The Nebraska Library Commission and the State Office of the CIO was awarded an Institute for Museum and Library Services (IMLS) grant of \$25,000 to pilot five school district/public library partnerships to share Internet over fixed-base wireless (5 GHz) connections during 2018-19. Internet speeds at these library homework hotspots will increase by 400-1500%.
- The Nebraska Department of Education (NDE), Nebraska Educational Telecommunications (NET), and the State Office of the CIO (OCIO) have begun exploring the feasibility of a statewide 4G/LTE wireless network solution using 2.5 GHz (EBS) spectrum. Conference calls have occurred with the Northern Michigan University's Educational Access Network (EAN) and the Kings County Office of Education in California, who each operate mature LTE networks for educational access.

#### **D. Nebraska's Infrastructure Environment**

11. Nebraska has significant statewide infrastructure that may make it a well-positioned location to implement a statewide wireless broadband solution.

- Nebraska currently has 30 active EBS licenses, with 73% leased to providers, and 13% transferred to providers, but in no way do the 30 active licenses present a comprehensive coverage of rural Nebraska.
- Nebraska has about 60 state-owned or state-leased towers at 90 meters or higher, almost all with fiber backhaul to the statewide network.
- All 244 public school districts and 17 Educational Service Units are fiber-connected to the statewide network.
- *Network Nebraska* has ample after-hours Internet capacity that could be used to supply a statewide EBS deployment.
- Nebraska school districts and colleges are prepared to utilize single sign-on authentication by students and staff to enable controlled access to wireless network resources.



- Nebraska has a highly collaborative partnership of state government, public television, K-12 and higher education engineers and technicians who work together for the common good.

#### **E. The Nebraska EBS Project Plan (NE-EBS Project)**

12. The *Future Ready Nebraska PK-12 Digital Learning and Ed Tech Plan* includes several goals focused on equitable learning opportunities, robust infrastructure, and use of space and time. The plan was developed by a diverse workgroup consisting of a broad range of stakeholders. It used the national Future Ready framework to develop the plan. The plan was adopted and is in the implementation phase. Equitable access to resources is key to achieving these goals. Use of EBS spectrum would be a vital and cost effective solution to reaching the Plan's access-related goals. [See *Future Ready Nebraska PK-12 Digital Learning and Ed Tech Plan* at <https://www.education.ne.gov/future-ready-nebraska/>]

13. Consideration was given to three different approaches:

- Renew existing local licenses and encouraging local education agencies and tribal governments to apply for new licenses during open windows of application, should the FCC grant those rules;
  - *Pros*- targeted, localized use as originally intended.
  - *Cons*- Difficult to organize all groups to act. Service areas are smaller and may not reach rural areas. Lack of technical wherewithal, no strategic pervasiveness or tactical placement of licenses for educational purposes.
- Encourage private providers to obtain new licenses to develop statewide coverage and to facilitate educational use by serving the unserved and underserved students in rural and urban areas;
  - *Pros*- Provider partnerships with education entities could provide coverage to rural areas. Latest technology would be utilized by providers experienced in operating large-scale wireless networks.
  - *Cons*- Profit is the driving decision factor. Private entities have historically avoided building out to low population density areas as well as low socio-economic areas. No guarantee that providers would reach all unserved areas or at a minimum cost to end users.
- Design and develop a state-sponsored or state-coordinated wireless network approach, using existing state infrastructure, and applying for new licenses in Geographic Service Areas that would ensure statewide coverage to address the digital divide.

- *Pros-* Mission driven to cover the entire population without regard to socio-economic status or population density. Leveraging state assets to reduce cost of implementation and low cost to end users. Utilization of state and University employees who have expertise and skills in building and maintaining a wireless network.
- *Cons-* Long-term build out. Initial capital costs could be difficult to assume.

14. **Considering option 3, a partnership of Nebraska Educational Telecommunications (NET), the Nebraska Department of Education (NDE), and the State Office of the CIO (OCIO) are performing a feasibility study and developing a deployment plan that would blanket the state from border to border with a wireless network using EBS spectrum to assure all learners in K-12 and higher education have access to digital learning resources.**

15. Nebraska's project (NE-EBS) is a partnership that will serve the most need with a key focus of creating equity while closing the homework gap. The project team has spent many hours researching and connecting with active projects in other states in order to conceptualize the most viable and sustainable network possible. NE-EBS broadband deployment would ensure the spectrum is put to its most beneficial use by responding to the K-20 need for anytime, anywhere services, and maximize the probability of success for new services.

16. This partnership brings together several needed resources to build a statewide solution. NET and the OCIO own or lease towers that can blanket the state with 2.5 GHz, as well as engineering expertise to design and maintain the network. The OCIO manages the fiber backhaul to each of the towers. *Network Nebraska* has ample internet and peering capacity for after hours and weekend use when students at home need it most. Three state data centers have additional space for wireless network equipment and are directly connected to the state's backbone. NDE provides distance learning resources to be used over the spectrum including, but not limited to, Open Education Resources (OER), distance/blended learning classroom tools, and learning management systems.

#### **F. NE-EBS technical feasibility overview:**

17. In the feasibility study, Nebraska identified thirty-five (35) towers for 3GPP (3<sup>rd</sup> Generation Partnership Project) LTE-A (Long Term Evolution Advanced) and 5G NR (New Radio) standards-based cellular network services deployment to cover the state of Nebraska. 5G NR offers:

- Scalable OFDM (Orthogonal Frequency Division Multiplexing) based air interface
- Flexible slot-based framework

- Advanced channel coding
- Massive MIMO (Multiple-input Multiple-output)

5G NR significantly increases broadband capacity, spectrum efficiency, accessibility, and reduces energy consumption. With scalable transmission time interval (TTI), 5G NR is more adaptable and dynamic, offers more diverse services and supports more diverse devices. 5G NR supports both licensed and unlicensed spectrum, provides an opportunity for spectrum sharing and coexisting with other technologies, such as Wi-Fi (<https://www.qualcomm.com/media/documents/files/expanding-the-5g-nr-ecosystem-and-roadmap-in-3gpp-rel-16-beyond.pdf>).

18. Out of the thirty-five (35) towers, twenty-four (24) towers are already interconnected to the State's fiber network, eight (8) NET towers can be linked to the State's fiber network via VLAN configuration, and only three towers would need to be connected to the State's fiber network through last mile configuration. This existing infrastructure would greatly simplify and reduce construction work and cost for the EBS services deployment [see Attachment E -Proposed 35-tower coverage map]. There are two assumptions for the coverage map: 1) EBS licenses would be obtained based on a 35-mile radius circular Geographic Service Area (GSA); 2) LTE end-user exchange can occur up to nine miles. The map is a conceptual illustration of an idealized situation where the state of Nebraska can be minimally covered with 35 towers. The actual number of towers and locations would be determined after tower studies and predictive coverages in the pre-implementation stage. Nebraska would utilize its abundance of tower resources as shown in Attachment F [see Attachment F: State Tower Resources] to implement this model. For example, some circular Geographic Service Areas with higher student density may require more than one tower and up to a maximum of 16 towers or community high points to provide suitable access and capacity to students.

19. Recently, Sprint and Ericsson field-tested Massive MIMO (Multiple-input Multiple-output) at 2.5 GHz. The test used 64x64 Massive MIMO radios and reached peak speeds of more than 300 Mbps using a single 20 MHz spectrum. Massive MIMO is the key technology of 5G and can be utilized for Nebraska deployment to reduce cost (<https://www.wirelessweek.com/news/2017/09/sprint-ericsson-unveil-results-25-ghz-massive-mimo-tests> ).

20. Design and implementation would comply with the latest 3GPP (3rd Generation Partnership Project) Standards and technologies available. NE-EBS anticipates actual deployment using C-RAN (cloud radio access network) architecture with BBUs (baseband unit) located at central locations, RRHs (remote radio head) on identified towers, and gateways strategically positioned for each coverage area based on population and propagation constraints (see Attachment G- Proposed deployment model). 5G technology may eventually offer service to students at home, in school, and on the

road, particularly aboard school buses. NET has expertise in RF (radio frequency) transmission, signal distribution, content streaming and traffic scheduling as well as monitoring and control of the whole system.

### **III. RECOMMENDATIONS**

#### **A. Rationalizing Existing 2.5 GHz Holdings (NPRM ¶ 10-24)**

##### **1. Regular Geographic License Areas (NPRM ¶ 10-18)**

21. Nebraska recommends that the Commission prioritize all alternatives for use of this spectrum that utilize new technologies to implement educational solutions. Licenses should be issued only if the usage will align to the “education” component of the *Education* Broadband Service. Solutions may be local, regional, or statewide ensuring that the radio spectrum is used efficiently and intensively in the public interest.

22. Equity is one of, if not the, primary reasons the NE-EBS project seeks EBS spectrum. This project could provide access to resources to students where they cannot get broadband locally. Providers have been reluctant to install cost effective connectivity to remote rural locations, creating a homework gap. Schools want to move forward with personalized learning, but this lack of equity makes it difficult and creates an unwillingness in educators to fully embrace digital tools. Nebraska is considering the use of the EBS spectrum to blanket the state and allow all learners direct connectivity to their school’s digital learning tools. Broadband companies have failed to do so, and giving them additional spectrum via EBS licensing has not solved the rural broadband challenges.

23. Nebraska supports the flexibility for license boundaries to overlap or be converted to a single license made up of a contiguous geographic area rather than require a collection of separate licenses. In its NE-EBS plan, spectrum would be used to blanket the state. Under current rule, this will require multiple licenses that overlap and expand into contiguous areas in order to assure that all students can make use of digital learning resources.

##### **2. Additional Flexibility for EBS Licenses (NPRM ¶ 19-24)**

24. **Educational use** (NPRM ¶ 22). The Commission suspended the processing of EBS applications in 1993 (NPRM ¶ 6). In formulating a response to this NPRM, the project team had conversations with the State Education Technology Directors Association (SETDA), the School, Health, Library Broadband (SHLB) Coalition, and other education advocates. They indicated a strong desire to

utilize EBS, but many lack the knowledge of how to use it. Technology has only recently become advanced enough to allow local and statewide deployments.

25. Nebraska advocates that priority to EBS spectrum remain an educational resource with enough time allowed for entities to understand and develop plans for its utilization. Nebraska reiterates its concern that EBS has only recently come into its own as a tool that is more useful now to education with the advent of technologies that make it cost effective to deploy and manage. The long delay in utilizing this spectrum has had a two-fold effect: 1) the respite of spectrum licensing has caused a significant loss of awareness of its existence and potential uses; 2) technology has advanced to a point where it can now be utilized.

26. Nebraska supports an optional contiguous spectrum solution when a viable proposal exists. If Nebraska was able to obtain enough spectrum to blanket the state for its educational use connectivity, it would only require about 35 licenses using the 35-mile GSA coverage area. If it is required to have a license for each county, it would require 93 licenses. If it is required to have one license per district, it would need 244 licenses. The need to provide equipment and connectivity to a provider source (in Nebraska's case, backhaul to the *Network Nebraska* educational backbone) is far less to facilitate if fewer locations for distribution are required.

## **B. Opportunities to Acquire New 2.5 GHz Licenses (NPRM ¶ 25-51)**

### **1. New Local Priority Filing Windows (NPRM ¶ 26)**

(NPRM ¶ 29) When the Commission reopened applications for the 2.5 GHz band in 1985, it expressed a "strong preference" for local applicants in the licensing process. The Commission found then that local applicants were "convincingly demonstrated . . . to be the best authorities for evaluating their educational needs and the needs of others they propose to serve in their communities," to "best understand the educational needs . . . of their communities," and to "act most responsibly in designing and developing [2.5 GHz] systems."

(NPRM ¶ 31). The majority of current EBS licensees, such as school districts, schools, colleges and universities, appear to have a local presence where they have licenses. It also appears that the entities most likely to be affected by a local presence requirement are the "national" licensees.

27. Nebraska agrees that local authorities are in the best position for evaluating the educational needs of their communities, and asks the Commission to consider that for the purpose of utilizing EBS spectrum, the State fulfills the definition of "local presence" (NPRM ¶ 29) and can best determine the educational needs of its population, including K-12, higher education, and workforce development. Local needs would also align with the State's interests in deploying rural broadband (See

Nebraska Rural Broadband Task Force, <https://governor.nebraska.gov/press/governor-ricketts-announces-rural-broadband-task-force-members>). Rather than rely on a collection of independent local entities to research and deploy EBS, the community, and state as a whole are better served by implementing a statewide solution. Shared resource and expertise may not be available locally and therefore some efforts may incur higher than needed costs, not be as successful, or fail in implementation altogether.

28. Nebraska agrees that local presence is essential in servicing the needs of the community and that local applicants are in the best position to evaluate their educational needs. However, recognition of local presence should include solutions that have the geographical impact as proposed by the NE-EBS Project. A more efficient use of the spectrum is achieved when it can be shared by a larger user group. Indeed, Nebraska's solution guarantees that the EBS spectrum would have an educational utilization and reach all eligible users in an equitable distribution. If a local presence becomes a requirement of the new ruling, Nebraska seeks identification of State Education Agencies (SEAs) in a statewide solution as having such presence in order that it may obtain the needed licenses to fulfill its objective.

29. Nebraska contends that its proposal would benefit local communities in an equitable fashion as well. Utilization of the network could be expanded to include identified gaps in service areas within local communities; such as, a need for telehealth data between homebound patients and doctors, emergency medical services fire/rescue communication in extreme rural areas where broadband is weak or not available.

30. Nebraska statutes (Neb. Rev. Stat. 86-594 to 86-597) restrict telecommunications competition by public agencies with for profit service providers, with exceptions for agencies in fulfilling their educational missions. Existing EBS license holders may have a legitimate need to expand their services, but they also may acquire licenses to be leased by a third party, such as a cellular service provider. The Nebraska project plan would create a statewide information service usable by students and staff who are end users from educational institutions that are already part of *Network Nebraska*.

*Local Priority Filing Window and Local Priority Filing Process.* (NPRM ¶ 32-48)

31. Currently, eligibility to hold an EBS license is limited to (1) accredited public and private educational institutions, (2) governmental organizations engaged in the formal education of enrolled students, and (3) nonprofit organizations whose purposes are educational and include

providing educational and instructional television materials to accredited institutions and governmental organizations (NPRM ¶ 3).

32. Nebraska recommends that the Commission retain this definition of educational entities and allocate all unissued licenses remaining in a State, to the State Education Agency (SEA), following any approved application windows. The SEA would be responsible for allocating licenses to appropriate entities as viable solutions are determined. Licenses would therefore not be gone forever through auction, but utilized for educational purposes as intended.

33. Because of the lack of knowledge on how to utilize EBS spectrum, any limits to time and geographic presence could also limit best practice. In addition to solutions such as the NE-EBS Project, other projects and purposeful use may be initiated by regional entities such as Intermediate Agencies (BOCES, ESAs, ESUs), community colleges, etc. These groups need time to understand the potential and the implementation aspects of using this service without risk of losing the opportunity because of a missed window or through the selling off of available licenses in their area. SEAs would be the most knowledgeable of these efforts and able to assign licenses appropriately.

34. A return of investment into supporting EBS services should be required on any funds from leased spectrum. A holding period of seven years would provide states time to either establish local best use of spectrum solutions, or lease to providers who have a viable solution for their community needs including education, telehealth, emergency response, workforce development, youth services or other underserved areas or population.

35. Nebraska supports an optional contiguous spectrum solution when a viable proposal exists. Nebraska asks that the Commission to consider geographic area to include proposals that transcend county and census tract boundaries. In the solution that Nebraska is considering, it would be a more efficient use of spectrum if geographic limits were not implemented. However, if a local entity chooses to apply for a license, it may be appropriate to limit coverage area. Flexibility is key.

36. Nebraska supports the 20% educational use requirement for existing license holders. This would provide a means to recapture misused or under-used licenses if required. Outright auctions or competitive bidding for commercial use is not conducive to the purpose of the EBS spectrum and should not be considered.

## **2. Licensing White Spaces (NPRM ¶ 49-51)**

37. Depending on the outcomes of this NPRM, use of white space and the spectrum aggregation screen may depend on how it is used. Nebraska is considering creation of a border-to-

border network to ensure all users have equity of access to digital resources, and at present, does not know how evolution of digital resources may affect future use and capacity.

### **3. Requirements for New 2.5 GHz Licenses (NPRM ¶ 52-55)**

#### *Performance Requirements for New 2.5 GHz Licenses (NPRM ¶ 54)*

*The Commission proposes robust performance requirements for any new 2.5 GHz licenses granted through a local priority filing window or a system of competitive bidding (pg 18, NPRM).*

38. Nebraska agrees with the Commission that educational use should be a priority, and it contends that education should be the only consideration in licensing this spectrum. Nebraska also agrees that existing holders or State education entities have first option at new licenses.

39. The E-rate program has a long history of success in making advanced telecommunications services affordable to schools and libraries. Nebraska sees the EBS spectrum as a natural outgrowth of available services to students utilizing the *Network Nebraska* broadband. Competitive bidding has always been a value embraced by education, and is one of the mainstays of the Federal E-rate program. With that historical success in mind, Nebraska seeks consideration that all unassigned licenses within a state be allocated to the SEA to be used by or competitively bid for the benefit of education with ongoing oversight by the state.

40. In its E-rate 2.0 Modernization Order, the Commission provided for after hours use of Internet service for educational purpose without resale. This may be a topic for a subsequent NPRM, however, Nebraska's plan would depend on the *Network Nebraska* backbone, while also complying with CIPA requirements. Student logins would either pass via VPN to their school's filtering service or through a statewide filtering service. In this state alone, tens of thousands of devices potentially go home with students in order that they complete online school work. This solution merely extends the same network they use at schools to their home for the same purpose of digital learning.

### **C. Cleaning up the 2.5 GHz Rules (NPRM ¶ 56-57)**

41. Nebraska's comments have expressed a desire to transform the 2.5 GHz band by allowing states to determine best usage to meet its educational purpose and to reach underserved or unserved areas of the state. These comments also support defining local presence to include a statewide solution as well as a larger or more ubiquitous coverage of geographic areas and contiguous spectrum utilization. The NE-EBS Project would utilize the most effective technology available ensuring that the bandwidth is put to its highest and best use.

### **D. Additional Approaches for Transforming the 2.5 GHz Band (NPRM ¶ 58-62).**



42. Nebraska does not support an auction of spectrum. This method would likely favor those who have the funds to outbid the most needy, and favor those who will use the spectrum as a for-profit tool. The SEA state managed allocation solution recommended in ¶ 27-32 above provides that the spectrum be used as intended and that any funds received as part of a competitive bidding process will return to support education within the state. This solution provides an ongoing benefit to both the users and the solution providers, which may include commercial providers, in spectrum utilization.

#### **IV. CONCLUSION**

43. In conclusion, Nebraska Educational Television, Nebraska Department of Education, and the Nebraska State Office of the Chief Information Officer applaud the FCC on its re-consideration and possible transformation of the 2.5 GHz EBS spectrum. We share the Commission's goal to ensure that our nation's students receive access to the high-speed broadband connectivity and technology necessary for 21<sup>st</sup> Century digital learning. Addressing the Homework Gap and lack of Internet access for students, particularly in rural areas, is of paramount concern. This lack of equity is having a detrimental effect on daily educational processes and almost certainly is affecting the quality and quantity of learning opportunities for the unserved and underserved students. As rural broadband speeds and costs remain static, urban residential Internet speeds are getting much faster and much more affordable. This contributes to a widening digital divide and no easy solutions are within sight.

44. The 2.5 GHz EBS spectrum provides an un-exploited opportunity to provide more equitable and more affordable access for students to reach their digital educational resources. Only recently has the technology evolved to the extent that local and regional LTE networks have been affordable to implement and manageable to maintain (e.g. Northern Michigan University; Kings County, CA Office of Education).

45. Our three agencies cooperatively envision a statewide approach to bridging the digital divide through either state-sponsored or state-coordinated infrastructure using newly granted EBS licenses. Nebraska would be able to use its public infrastructure assets (e.g. towers, backbone, commodity Internet and peering, technical support) to effect an efficient and effective model. The State of Nebraska respectfully requests that the FCC permit flexibility in re-licensing to enable a statewide approach. Several decades of locally controlled licenses have not brought about the results envisioned from the 2.5 GHz spectrum, and now a new generation of cellular data transmission technologies make this spectrum incredibly promising.

46. Most of the current and future potential educational licensees are new to the idea of effective use of the EBS 2.5 GHz spectrum, so allowing a fixed time period to learn about and research how other entities and agencies are implementing solutions should be given consideration. A multi-use approach based on projected implementation and utilization of the spectrum, and not just applying for a license without a utilization plan, is a more effective use of EBS. This is a valuable resource to education. Let us work together to see that the 2.5 GHz (EBS) spectrum delivers its full potential.

**About NET:** Nebraska Educational Television (NET), **including Nebraska's PBS & NPR Stations**, is the statewide public media service dedicated to creating opportunities for Nebraskans to engage with critical issues, compelling stories and quality entertainment. NET serves each of Nebraska's 93 counties with 52,560 hours of programming each year on four television and two radio channels, plus online and mobile content. In addition to providing free, high-quality educational programming for children, NET provides programming in the arts, award-winning news and current affairs information and emergency alert services. NET's mission is to enrich lives and engage minds by connecting communities and celebrating Nebraska with services that educate and enlighten. For more information about NET, visit <http://netnebraska.org/>.

**About NDE:** The Nebraska Department of Education (NDE) is a constitutional agency and operates under the authority of an elected board of education. NDE is organized into teams that interact to operate the agency and carry out the duties assigned by state and federal statutes and the policy directions of the State Board of Education. The teams are organized around distinct functions and responsibilities that encompass leadership and support for Nebraska's system of early childhood, primary, secondary and post-secondary education; direct services to clients; and internal support to the agency. The department carries out its duties on behalf of Nebraska students in public, private, and nonpublic school systems. The staff of the department interacts with schools and institutions of higher education to develop, coordinate and improve educational programs. NDE's mission is to lead and support the preparation of all Nebraskans for learning, earning, and living. For more information about NDE, visit <https://www.education.ne.gov/>.

**About the OCIO:** The Office of the Chief Information Officer (OCIO) was created by the Nebraska Legislature to assure that a coordinated, efficient and cost effective approach is taken on an enterprise level for the deployment of technology by Nebraska State Government. The Office of the CIO provides a wide range of technology services to state agencies, boards and commissions, as well as political subdivisions. As the State continues to explore shared services, the OCIO has eliminated the duplication of several IT expenditures and services, lowered costs through enterprise purchases and agreements, and provided more efficient and effective ways to expand access to government services. The OCIO also manages *Network Nebraska*, the statewide network consortium that serves 293 education entities. The OCIO's mission is respect for the taxpayers of Nebraska. For more information about the OCIO, visit <http://www.cio.nebraska.gov/>.

Respectfully submitted on August 8, 2018,



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## NE-EBS: ATTACHMENT A

### 12/2016 Parent Email to School District OR1 (Palmyra) personnel regarding access to digital resources

----- Forwarded message -----

From: **Janet Harder** <[janet.harder@gmail.com](mailto:janet.harder@gmail.com)>

Date: Thu, Dec 8, 2016, 8:55 PM

Subject: Rollout of Chromebooks

So, here Liz & I sit, in the running car, outside the library in Syracuse, so we can use the free WiFi.

Liz tells me she was told, "Since you get to take the Chromebooks home, you have no excuse for not getting the vocabulary homework done." She says she was not given any instructions for how to access and use any of the functions of the chromebook while NOT connected to the internet.

Nate and Daniel also did not hear any instructions for using it off-line. Daniel attempted to make his work available off-line on Friday. On Saturday, I observed Daniel having problems with Google Docs crashing repeatedly while off-line this weekend, and he was unable to work on his essay while we were in Kansas.

Perhaps you assume everyone has internet access at their homes. I don't believe you have data to support that. Even when some family members have internet access via their smartphones, using a smartphone as a wifi hotspot can burn through data quickly. We don't have a smartphone, and have a hotspot only so my husband can use the internet while at work. We can't afford to have the kids use a lot of data.

I strongly believe there needs to be something in writing, sent to all the parents, explaining exactly how the chromebooks work, and what the students need to do if they do not have unlimited data when not in school. I would also like to know what other applications they can download. (OpenOffice, for example, is a free, and relatively full featured office suite, but does the chromebook have the memory/processing power to run it?)

A similar reminder needs to be given to all the teachers, so they are able to assist the kids, and help them remember the steps needed. They also need to be made fully aware that anytime they give an assignment where the resources needed to complete that assignment are online, they need to give the students time to access and download those resources.

Failure to take these steps will tend to place a burden on students who do not have 24/7 unlimited data access. It will increase the digital divide, and unfairly penalize students who are not able to access unlimited data. For those homes with metered data (nearly anyone who uses a cell phone provider for their internet), you are likely to cause financial hardship on those families, as their students use data when they could work off-line, because the student doesn't know how to be a wise data user. Rural families are less likely to have internet, and more likely to pay a higher price for that access, when they have it.

[http://www.omaha.com/news/metro/census-data-on-internet-computer-access-show-that-digital-divide/article\\_9c973635-6b90-5b7e-8043-38196e1070f3.html](http://www.omaha.com/news/metro/census-data-on-internet-computer-access-show-that-digital-divide/article_9c973635-6b90-5b7e-8043-38196e1070f3.html)

I applaud District OR1 for making sure students have access to the technology. But you need to be watchful that careless assumptions don't lead certain students to worse grades, simply because of limited or no internet at home.

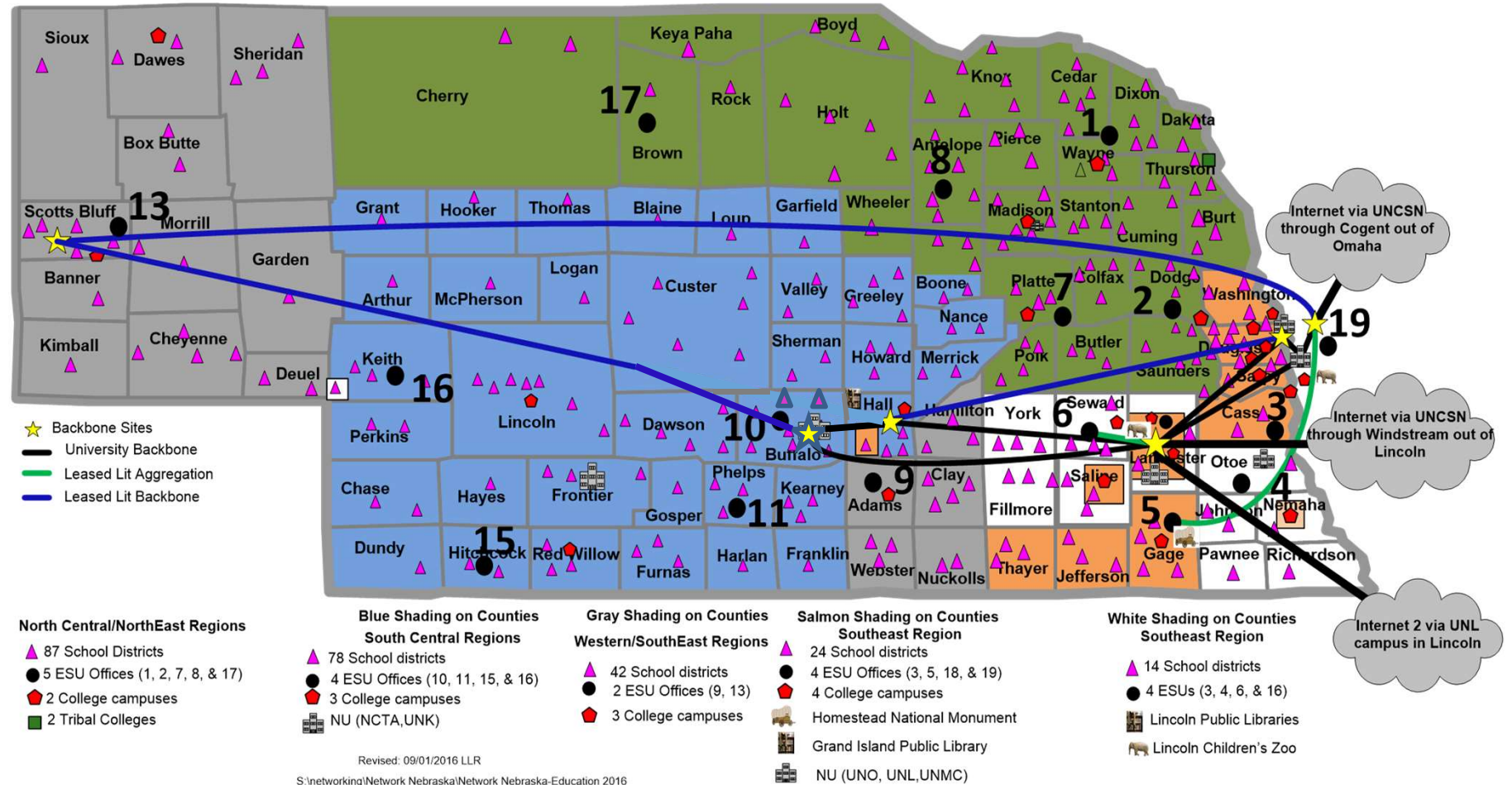
By expecting the students affected will just figure it out, you are being unfair to them, and especially to those students who may have IEPs that will need adjusting. Some of those students will need even more direct instruction so they will be successful.

Thank you for considering my concerns. I look forward to hearing from (any and all of) you.

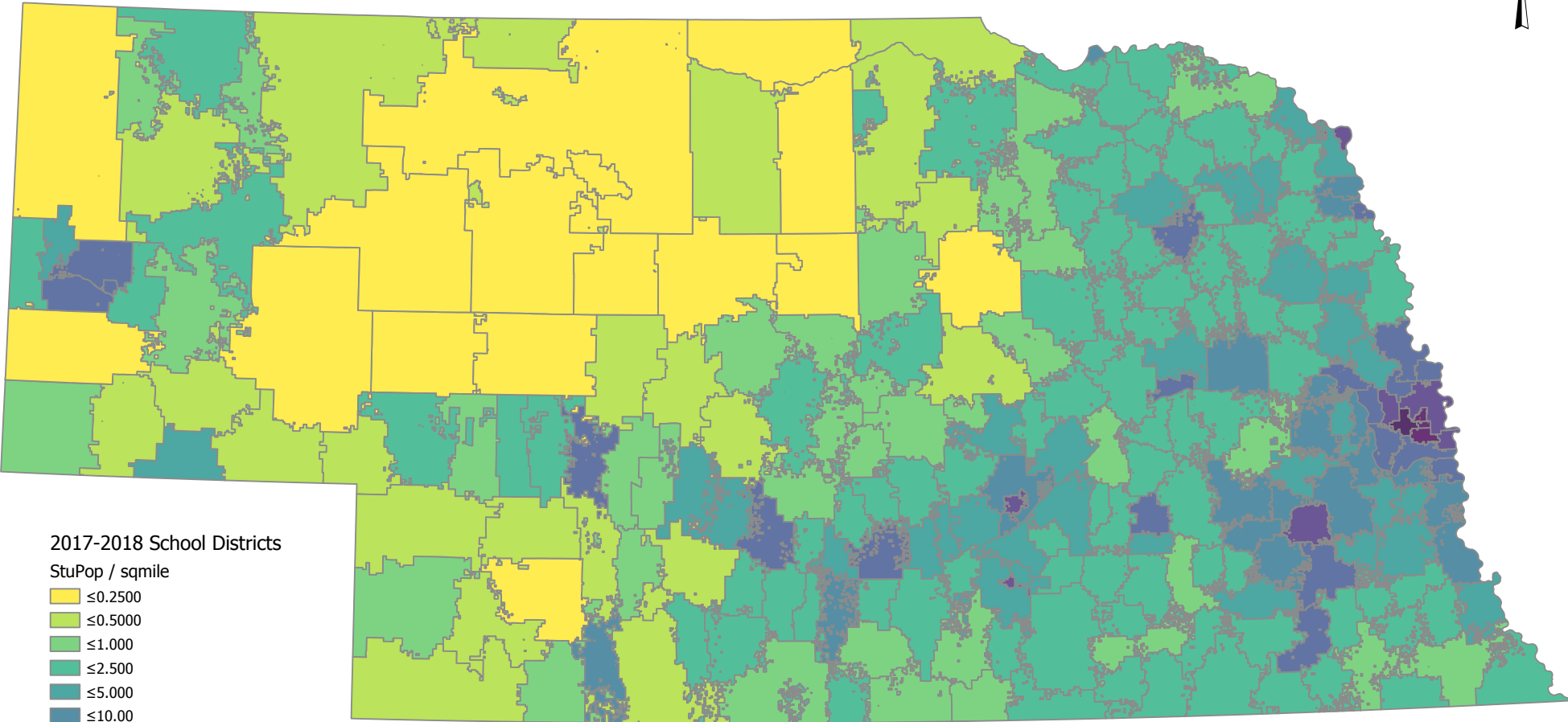
Janet Harder  
Rural Unadilla

(I've got the ESU fiber running down the road in front of my house, but I can't use it. No cable. No DSL. We could use satellite, and possibly, with some construction, a line-of-sight provider. No money for that right now. Teens and car insurance, you know?)

# Network Nebraska – Education 2018



# Map of school district student sparsity



2017-2018 School Districts

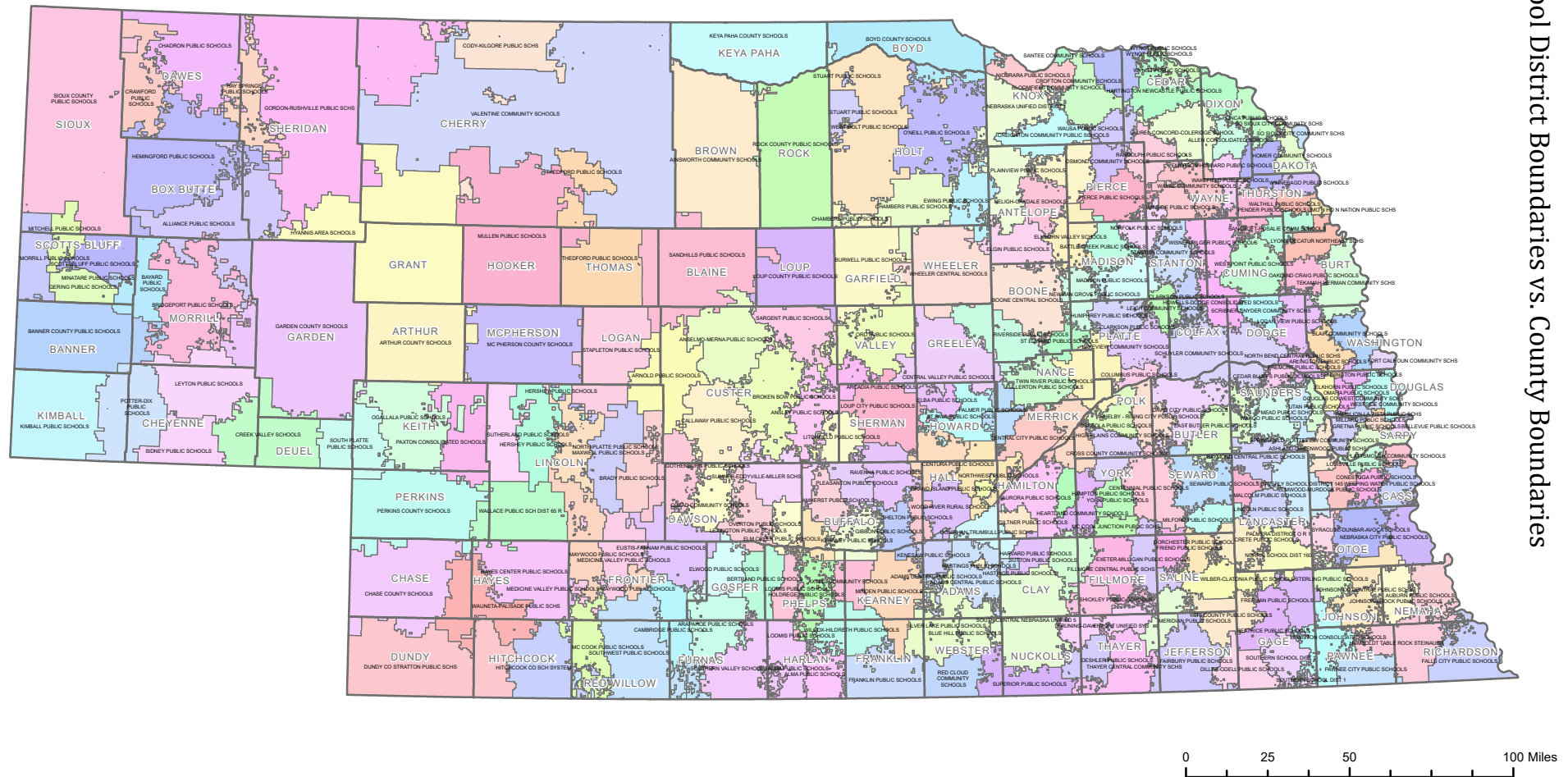
StuPop / sqmile

- ≤0.2500
- ≤0.5000
- ≤1.000
- ≤2.500
- ≤5.000
- ≤10.00
- ≤100.0
- ≤400.0
- ≤600.0
- over 600

0 35 70 140 Miles



# Nebraska Public School Districts



Map Produced for:  
Legislative Research Office  
State of Nebraska

Data Sources:  
School boundary and county data provided by US Census, 2012.

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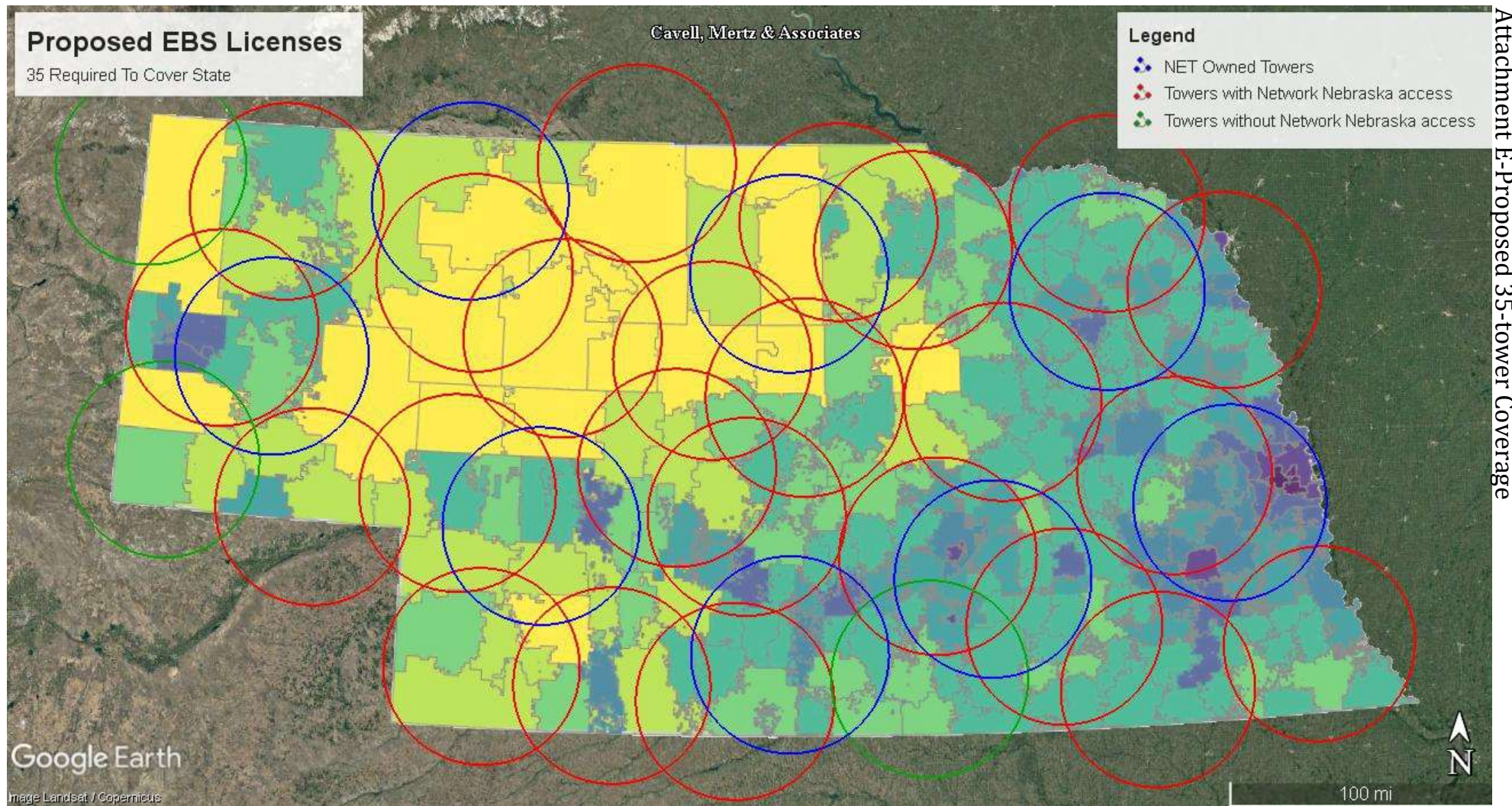
Nebraska Information Technology Commission  
State of Nebraska | Office of the CIO



Map Production by: OCIO- GIO office  
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May 6, 2013, Updated 8/2/2018

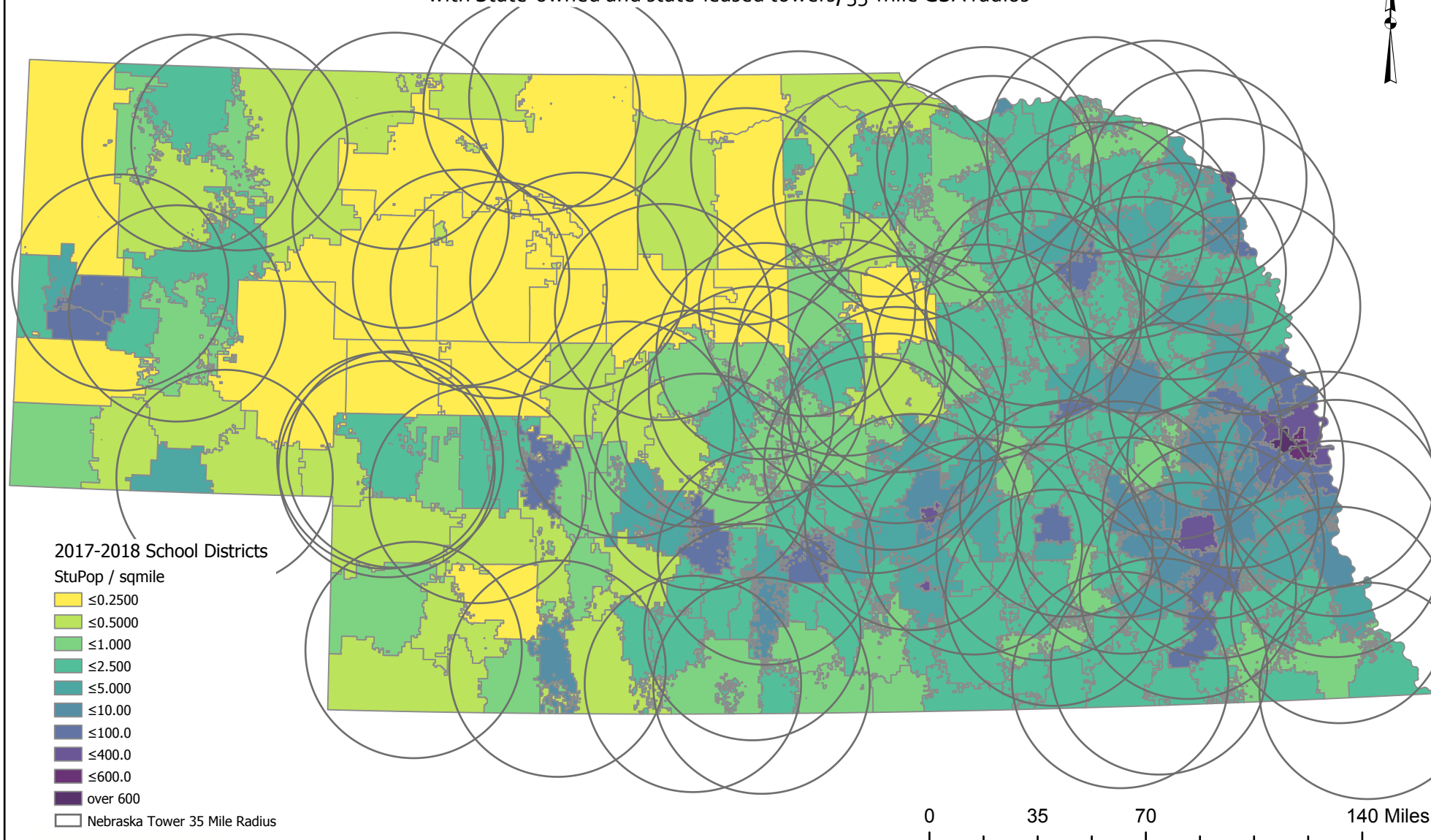






# Map of school district student sparsity

with State-owned and state-leased towers, 35-mile GSA radius



## Attachment G-Proposed Deployment Model

